DRAFT

ENGINEERING EVALUATION REPORT

Plant Name:	**CITY OF SAN MATEO, FIRE STATION #23**
Application Number:	**14274**
Plant Number:	**17658**

Background:

The applicant is applying for an Authority to Construct for a new Emergency Stand-By Diesel Power Generator. The applicant is requesting an Authority to Construct for the following equipment:

S-1 Emergency Stand-By Diesel Generator; Perkins Model 1004C-2442, 94.5 BHP

CUMULATIVE EMISSION CALCULATIONS

This engine has been certified by the California Air Resources Board under Executive Order U-R-022-0071, as a member of the EPA/CARB family 5PKLX04.RG1. For calculating emissions from this engine, EPA emission factors for all criteria pollutants except SO2 were used. They are as follows:

PM	0.15	g/bhp-hr
NOx	4.56	g/bhp-hr
CO	0.60	g/bhp-hr
ORG	0.36	g/bhp-hr
SO2	0.93	g/bhp-hr

The applicant requested 50 hours per year for year testing and maintenance purposes. Using 50 hours per year, criteria emissions are as follows:

SOURCE S-1		PM10	NOX	CO	TOC	SO2
	BHP	G/BHP-HR	G/HR	G/HR	G/HR	G/HR
g/bhp-hr unabated	94.5	0.15	4.56	0.60	0.36	0.98
TOTAL LB/HR		14	431	56	34	93
LB/MGAL		0.03	0.95	0.12	0.08	0.20
TOTAL LB/DAY		0.75	22.79	2.98	1.82	4.92
TOTAL LB/50 HRS		1.56	47.48	6.21	3.78	10.24
TOTAL TPY		0.0008	0.024	0.003	0.002	0.005

BACT/TBACT REVIEW

Under Regulation 2, Rule 2, any new source which results in an increase of criteria pollutants must be evaluated for adherence to BACT control technologies. A BACT review is required if the engine emits more than 10 lbs/day of any criteria pollutant. Since NOx emissions exceed the trigger level of 10 lbs/day, a BACT review is required. For compression ignition I.C. engines, this means the engine must be fired on "California Diesel Fuel" (fuel oil with less than 0.05% by weight sulfur content, and less than 20% by volume aromatic hydrocarbons). BACT also requires that the engine emit no more than 6.9 g/bhp-hr of NOx. The proposed engine meets BACT requirements.

TBACT requires that the engine emit no more than 0.15 g/bhp-hr of diesel particulate matter (PM). Based on the engine's certified emission factors under CARB Executive Order U-R-002-0071, the engine does not meet TBACT, as its PM emissions are 0.22 g/bhp-hr. However, CARB has approved modified emission factors for this particular engine model subsequent to the formal approval of the engine under the above Executive Order. The modified PM emission factor is 0.15 g/bhp-hr, and therefore the engine meets TBACT.

TOXIC RISK MODELING

The District uses PM emissions as a proxy for toxic emission exposure to surrounding residential and industrial populations. A PM emissions level of 0.58 lbs/year automatically triggers a health risk assessment under Regulation 2, Rule 5. At a maximum 50 hours per year permitted operation of this engine, this application exceeds a PM emission level of 0.58 lbs/year and so requires that a health risk assessment be performed.

A health risk assessment for the facility was performed using a nominal rate of 1 g/sec of diesel particulate emissions for the generator. Emissions will exit through a 4" stack located 6 feet above ground level. The stack is vertical with a raincap. MST1996 (local) meteorological data was used. Residential risk is based on a continuous 70-year exposure to annual average pollutant concentrations. Distance and directionality were used as the primary considerations to determine sites of maximum exposure. Both industrial and residential risks were considered in both urban and rural terrain settings.

The proposed generator is within 1000 feet of two schools, Beresford Elementary School, and St. Gregory's Elementary School. Ground level concentrations of PM10 were calculated at the closest outer boundary of each of the schools. For students, the modeling assumptions include an increased breathing rate of approximately 10.5 m^3 per day, and exposures that are for 36 weeks per year over a 9-year period. The projected carcinogenic and non-carcinogenic risk levels at those point was determined to be significantly less than 1 in a million.

At 50 hr/year operation, the generator would result in a maximum annual average residential GLC of 263.94 µg/m3, resulting in a carcinogenic risk of approximately 1.97 in a million, and a maximum annual average non-residential GLC of 151.42 µg/m3, resulting in a carcinogenic risk of approximately 0.94 in a million. The maximum annual GLC at St Gregory's Elementary School is

7.33 µg/m3 per g/sec, resulting in a cancer risk of approximately 0.0097 in a million, and the maximum annual GLC at Beresford Elementary School is 3.05 µg/m3 per g/sec, resulting in a cancer risk of approximately 0.004 in a million. Maximum chronic hazard indices are less than 1.0 in all cases.

COMPLIANCE DETERMINATION

This generator is covered under ministerial exemption, Chapter 2.3 of the BAAQMD Permit Handbook. CEQA is not triggered for emergency stand-by generators under this provision.

This generator is also governed by the **California Air Resources Board's Air Toxic Control Measure for Stationary Compression Ingition Engines, CCR Title 17, Section 93115.** The explicit annual equipment usage limitation of 50 hours per year except for operation under emergency conditions (Reg 9-8-330) will be included as part of the permit conditions.

The generators are also governed by the provisions of **Regulation 2, Rule 5, "New Source Review for Toxic Air Contaminants."**

The engine is exempt from emission limitations of District **Regulation 9, Rule 8-301 and 8-302**, "Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines," since it meets the provisions of **Regulation 9, Rule 8-111.1**, (operation of less than 200 hours per year and firing rate of 1000 BHP or less).

Visible emissions will be required to meet Ringelmann 2.0 limitation per **Regulation 6-303**.

Sulfur emissions will be controlled by the requirement that any fuel used in the engine meet California Clean Air fuel content of 0.05% bw sulfur, per **Regulation 9-1**.

This is a new source, and no sources are proposed to be closed in connection with this application. The facility currently emits less than 0.01 TPY of criteria pollutants (including the emissions from this application). No single source emits more than 1 TPY of PM10 or SO2 or 15 TPY of POC or nitrogen oxides. Therefore, the facility is not subject to emission offset requirements under Regulation 2-2-302 or 2-2-303.

CONDITIONS

Condition #23032, setting out the operating conditions and recordkeeping requirements for operations at Source S-1 shall be made part of the source's authority to construct/permit to operate.

RECOMMENDATION

I recommend that an Authority to Construct be issued for the following source:

S-1 Emergency Stand-By Diesel Generator, Perkins Model 1004C-2442, 94.5 BHP

subject to Condition #23032.

By Catherine Fortney Date 5/26/06
PSD Evaluator

COND# 23032 ----------

1. Emergency stand-by generator S-1 shall be fueled exclusively by diesel fuel having a sulfur content no greater than 0.05% by weight. [Reg 9-1-304]

2. Emergency stand-by generator S-1 shall only be operated to mitigate emergency conditions or for reliability-related operations. Operations for reliability-related activities shall be limited to 50 hours per generator in any consecutive 12-month period. Operation while mitigating emergency conditions is unlimited. [CARB ATCM for Stationary CI engines]

3. Emergency conditions are defined as any of the following:
   a. Loss of regular natural gas supply
   b. Failure of regular power supply
   c. Flood mitigation
   d. Sewage overflow mitigation
   e. Fire
   f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor [Reg 9-8-231]

4. Reliability-related activities are defined as any of the following:
   a. Operation of an emergency stand-by engine to test its ability to perform for an emergency use
   b. Operation of an emergency stand-by engine during maintenance of a primary motor [Reg 9-8-232]

5. The emergency stand-by engine shall be equipped with a non-resettable totalizing meter that measures and records the hours of operation for the engine. [Reg 9-8-530]

6. The following monthly records shall be maintained in a District-approved log for at least 2 years and shall be made available to the District upon request:
   a. Total hours of operation for each generator
   b. Total hours of operation under emergency conditions for each generator, and a description of the nature of the emergency condition
   c. Total fuel usage for each generator [Reg 9-8-530]